Amendments to the Claims

1. (Original) An apparatus for cleaning a surface within a vessel having a vessel wall separating a vessel exterior from a vessel interior and having a wall aperture, the apparatus comprising:

an elongate conduit having an upstream first and a downstream second end and positioned to direct a shock wave from the second end into the vessel interior;

a source of fuel and oxidizer coupled to the conduit to deliver the fuel and oxidizer to the conduit;

an initiator positioned to initiate a reaction of the fuel and oxidizer to produce a detonation wave within the conduit for generating the shock wave; and

a source of a purge gas coupled to the conduit to introduce the purge gas to the conduit to drive reaction products of the fuel and oxidizer downstream.

2. (Original) The apparatus of claim 1 wherein:

the conduit comprises a first portion and a second portion downstream of the first portion;

the first portion has a first characteristic cross-sectional area and the second portion has a second characteristic cross-sectional area, greater than the first characteristic cross-sectional area; and

the initiator is positioned to initiate a deflagration of the fuel and oxidizer in the first portion, with a deflagration-to-detonation transition from said deflagration producing said detonation wave.

3. (Original) The apparatus of claim 1 wherein the source of fuel and oxidizer comprises:

a first fuel source of a first fuel;

a first oxidizer source of a first oxidizer;

a second fuel source of a second fuel; and

a second oxidizer source of a second oxidizer.

4. (Original) The apparatus of claim 3 wherein:

the second fuel and oxidizer sources are coupled to the conduit downstream of where the first fuel and oxidizer sources are coupled.

5. (Original) A method for cleaning a surface within a vessel, the vessel having a wall with an aperture therein, the method comprising:

introducing fuel and oxidizer to a conduit;

initiating a reaction of the fuel and oxidizer so as to cause a shock wave to impinge upon the surface; and

introducing a pressurized purge gas to the conduit.

6. (Original) The method of claim 5 performed in a repeated sequential way.

7. (Original) The method of claim 5 wherein:

the reaction comprises a deflagration-to-detonation transition.

8. (Original) The method of claim 5 wherein:

the purge gas comprises in major portion air.

9. (Original) The method of claim 5 wherein:

the purge gas is introduced through a purge gas port in an upstreammost 20% of a flowpath length within the conduit.

10. (Original) The method of claim 5 wherein the introduction of the fuel and oxidizer comprises:

introducing a first fuel and a first oxidizer forming a first fuel/oxidizer mixture; and

introducing a second fuel and a second oxidizer forming a second fuel/oxidizer mixture, the second mixture being less detonable than the mixture.

11. (Original) The method of claim 10 wherein:

the second oxidizer is less oxygen-rich than the first oxidizer; and

the second fuel/oxidizer mixture is introduced as a mixture.

12. (Original) The method of claim 10 wherein:

the second fuel/oxidizer mixture provides a slower reaction chemistry than a reaction chemistry of the first fuel/oxidizer mixture.

13. (Original) The method of claim 10 wherein:

a major portion of said first fuel/oxidizer mixture is provided before a major portion of said second fuel/oxidizer mixture is provided.

14. (Original) The method of claim 10 wherein:

a major portion of said first fuel/oxidizer mixture is provided after a major portion of said second fuel/oxidizer mixture is provided.

15. (New) The method of claim 10 wherein:

the vessel is a coal- or oil-fired furnace.

16. (New) The method of claim 10 wherein:

the surface is of a tube bundle.

17. (New) The method of claim 5 wherein:

the vessel is a coal- or oil-fired furnace.

18. (New) The method of claim 5 wherein:

the surface is of a tube bundle.

19. (New) The method of claim 5 wherein:

a baseline flow of the purge gas is maintained between charge/discharge cycles of the conduit so as to prevent gas and particulate from the vessel from infiltrating upstream and to assist in cooling of the conduit.